CHARLES RIVER WATERSHED STUDY

STATUS REPORT

1 October 1967

Prepared by

New England Division, Corps of Engineers

424 Trapelo Road, Waltham, Mass.

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AUTHORITY

1. Resolved by the Committee of Public Works of the House of Representatives dated 24 June 1965. Assigned to NED by OCE, by letter of 1 July 1965.

STUDY AND REPORT

2. Scope. Plan of development to meet present and future requirements for water supply, flood control, navigation, water quality control, recreation, fish and wildlife and other purposes requiring development of water and related land resources. Plan to meet these needs through 1980 and indicate potentials to meet needs through 2020.

3. Coordination. A Coordinating Committee comprised of Federal and State agencies under the Chairmanship of the Division Engineer, New England Division, Corps of Engineers is as follows:

Federal

Benjamin Isgur, Department of Agriculture
Mark Abelson, Department of Interior
Edwin W. Webber, Department of Commerce
Frank Tetzlaff, Dept. of Health, Education & Welfare
Frank A. Batstone, Dept. of Housing & Urban Development

State

Robert L. Yasi, Dept. of Natural Resources
Howard Whitmore, Jr., Metropolitan District Commission

In addition, a Citizen's Advisory Committee of 28 members provides contact with special interest groups and municipalities of the Watershed.

DESCRIPTION OF STUDY AREA

4. The Charles River Watershed in eastern Massachusetts is at the northeastern end of the 500 mile Atlantic coastal megalopolis, from Boston to Washington. The Charles River Watershed extends 31 miles southwesterly from Boston Harbor toward the Providence-Woonsocket region, and includes all or parts of five cities and thirty towns, in parts of four Massachusetts counties. In 1965, the watershed population was 856,000 or more, as reported in the Massachusetts State Census. The Watershed is about 307 square miles in area and hour glass in shape; the length is 31 miles, and the widths are 15, 6 and 15 miles. Elevations vary from 560 feet, msl, along the southwesterly rim of the watershed in Milford and Hopkinton, to below 10 feet, msl, in the northeast along the lower $8\frac{1}{2}$ miles of the Charles through Watertown, Cambridge, and Boston.

ELEMENTS OF INVESTIGATION

5. As outlined in paragraph 2, the Charles River Watershed study will provide a plan for water resource development and conservation. Three aspects of resources are being evaluated: first, the resources themselves -- surface water, ground water, and closely related land resources; second, existing man-made developments and programs; third, potentials for further development and for watershed plan implementation.

6. To report study status and progress, principal items of work are shown on the attached "Schedule and Progress Chart." The Inventory Study items listed in paragraph 7 below will provide the data from which the Watershed Plan will be developed, also the Reports and Appendices.

A Lower Charles Interim Report and Appendices covering the Watershed downstream of Moody Street Dam is scheduled for submission early in 1968.

7. The following paragraphs briefly describe the principal work items and their interrelations.

a. General and Economic. This item includes gathering general descriptive and historical information and urban data such as population, employment and land use. Projections of urban growth will be made through the year 2020 for determining needs for water resources and community services.

b. Flood Control. This item covers a determination of the extent and location of flooding in the watershed and means of preventing or reducing future flooding and flood damage along the Charles and its tributaries. Consideration is being given to a number of possibilities including increasing conduit and channel capacities, pumping flood runoff from the Charles River Basin to Boston Harbor during periods of high tide, and finally reservoir storage in the upper Charles and its tributaries to retain flood flows.

c. Reservoir Storage. Consideration is being given to single and multiple-purpose storage reservoirs on the Charles and its tributaries. Storage may be used to provide improvement for fish and wildlife, for recreation, for water supply, for low-flow augmentation and for flood control.

d. Low-Flow Augmentation. Low-flow augmentation depends principally on releases from reservoir storage. On occasion, low flows in the lower Charles have been augmented by inputs of aqueduct waters from MDC non-Charles sources. Alternative means of low-flow augmentation and benefits to pollution abatement and recreation are being considered.

e. Water Supply. Under this item, the present water use and sources of supply are being inventoried and future needs estimated.

To meet the estimated future needs, consideration will be given to the adequacy of water resources available within the Charles watershed and to the need for increasing the existing draft on outside sources.

f. Fish and Wildlife. A number of approaches are being examined for preserving and improving fish and wildlife habitat in the Charles and its tributaries, including lakes and ponds, and related land resources. Selection of measures to be considered importantly depends on the flood control, reservoir storage, low-flow augmentation and sewerage and pollution control measures recommended under items b, c, d, and e, above.

g. Pollution and Sewage. In this item, two kindred but separate topics are being studied. In the downstream half of the watershed, most of the piped municipal sewerage is connected into the MDC trunk sewer system, with treatment and discharge into the Atlantic Ocean, off Deer

Island, outside Boston Harbor. Storm peak sewage overflows from combined sewers in the older, densely built-up municipalities may be found to be significant sources of Charles River pollution downstream of South Natick Dam. The FWPCA is inventorying and identifying water quality and pollution sources on the Charles and tributaries as part of larger FWPCA studies.

h. Recreation and Open Space. To meet the recreation and open space needs of the numbers of watershed residents and of visitors, determined in item e., above, item h studies will identify and evaluate available water and related land resources and will list and describe suggested locations for future acquisition and development by Federal, state, municipal or private agencies.

i. Navigation. This study item is to meet the navigation needs of industries and of the numbers of watershed residents and of visitors determined above, including boat clubs, enterprises and institutions, on and near the Charles.

8. The Lower Charles Interim Report will draw together selected information from the above listed topics, but only pertaining to the lower $12\frac{1}{2}$ miles of the Charles below Moody St. Dam, Waltham, bearing mainly on flood control, navigation (both commercial and recreational) and pollution in that part of the River.

9. The Watershed Plan and Report and Appendices will be developed from the facts and findings in the above-stated studies 7a through 7i.

The elements of all these studies are further described, with specific agency work assignments, in the Charles River Plan of Survey dated 30 August 1967.

SCHEDULE AND STATUS

10. Hearings and Meetings have been held as follows:

a. Public Hearings (digest available)

Waltham, 17 January 1967
Wellesley, 19 January 1967
Franklin, 24 January 1967

b. Coordinating Committee Meetings (minutes available)

9 December 1966
18 April 1967
26 September 1967

c. Citizen Advisory Committee Meetings (apply to Committee for Minutes)

1 May 1967
8 June 1967
4 October 1967

11. Study Progress is stated below by work items as in paragraph 7, above, and as on the chart attached.

a. General and Economic. Physical features of the Watershed have been examined and inventoried. April 1965 aerial photographs have been secured. U.S.G.S. and other map resources have been examined. Maps at 3,000; 2,000, and 1,000 ft. per inch scale have been prepared of the entire River, and 500 ft. per inch scale sheets of the Lower Charles. A centerline profile with water surface and approximate river bottom

elevations has been made. Bridges and dams have been inventoried, examined, photographed, and recorded. Sonic soundings of the Charles River Basin, 1967, have been compared with prior soundings of 1902.

The population and urbanization of the Watershed have been examined, inventoried since 1630, and analyzed as of 1765, 1865 and 1965. The Charles River Watershed is recognized as the northeastern terminus of the American Atlantic Megalopolis, and the future population and further urbanization of the Watershed are being studied with that in mind.

Archaeologic and prehistoric aspects of the Watershed are being studied by a qualified consultant to the U. S. National Park Service.

Historic sites and buildings from 1600 A. D. onward are being inventoried by a joint effort of the Massachusetts Historical Commission and the Massachusetts Department of Public Works, through the Federally-aided Eastern Massachusetts Regional Planning Project. Thirteen inventories were completed in June 1967 in six Lower Charles communities and seven Upper Charles communities: Arlington, Charlestown, Cambridge, Lexington, Lincoln and Somerville, in the Lower, and Bellingham, Franklin, Foxboro, Hopkinton, Medway, Milford and Wrentham, in the Upper Watershed.

Seventeen additional Charles River communities are now being inventoried, eight in the Lower Watershed and nine in the Upper: Belmont, Boston, Brookline, Waltham, Watertown, Wayland, Weston, and Westwood in the Lower; also Ashland, Dover, Holliston, Hopedale, Medfield, Mendon,

Millis, Sherborn, and Walpole in the Upper Watershed. Completion of these additional inventories is anticipated 1 July 1969. On completion, important parts of Boston and 28 other of the 35 Watershed municipalities will have been inventoried as to historic buildings and sites. The six Charles River municipalities not yet scheduled for historic inventory are Dedham, Natick, Needham, Newton, Norfolk and Wellesley.

b. Flood Control. Abstracts have been made of relevant records of rainfalls, runoff, tides, storms, and of prior flooding on all sections of the Charles and on the Muddy River in Brookline and Boston. Studies made for the Metropolitan District Commission by consultants 1956-1959 have been examined relative to Charles River Basin flooding, including that of 19 August 1955. An abstract of costs, up-dated, has been made by the Corps as to new construction proposed by the M. D. C.

c. Reservoir Storage. The Corps is studying main river storage potentials and is considering other means of storage at and above Watertown Dam. The U. S. Department of Agriculture, Soil Conservation Service, is studying storage potentials on Tributaries of the Charles at and upstream of South Natick Dam. Operations of the Hobbs Brook and Stony Brook Reservoirs in the City of Cambridge Water System have been examined. Thirty years of monthly operating records were made available to the Corps for analysis of widely varying annual run-offs from the Stony Brook Sub-Watershed (23.6 sq. mi. area) in Waltham, Weston, Lincoln and southwestern

Lexington.

d. Low-Flow Augmentation has been a continuing goal in the search for additional storable or economically divertable waters for the Charles. The legislative authorization and specific requirements for M. D. C. addition of dilution waters to the Charles have been studied, also the record of M. D. C. waters actually supplied, year by year, in recent years. The monthly and daily low-flow records of the Charles at the three U. S. gaging stations on the River have been studied, relative to the river conditions reported at the January 1967 public hearings.

e. A Water Supply inventory of the entire Watershed, town by town, is being made from NENYIAC and other Federal sources, also from Commonwealth of Massachusetts data in the Massachusetts Department of Natural Resources, and in the Metropolitan District Commission. A two-thirds Federally-aided consulting report to the M. A. P. C. on water supply and distribution in the entire M. A. P. C. area, including much of the Charles River Watershed, is due 1 July 1968. A Federally-aided reconnaissance report to the Eastern Massachusetts Regional Planning Project covering all 35 Charles River municipalities was completed in July 1967.

f. Fish and Wildlife Resources of the Charles are briefly mentioned in a preliminary report of January 1967 by the U. S. Department of the Interior, Fish and Wildlife Service, with cooperation by the Commonwealth of Massachusetts, Department of Natural Resources, Fish and Game Division. The fish and wildlife biologist of the New England Division, Corps of Engineers is further examining and reporting by study sectors on

the entire 80-mile length of the Charles River. A narrative report on a field reconnaissance of the River, the summer of 1967, is being prepared.

g. Pollution and Sewage Disposal. Sources of pollution along the Charles and tributaries are being geographically located, and are being identified as to nature of effluent and agency sources, by the U. S. Department of the Interior, Federal Water Pollution Control Administration. Forty-two inflows have been listed by the FWPCA, and were mentioned to the 26 September 1967 Charles Coordinating Committee meeting. Charles River water qualities data were taken during the summer of 1967 at 17 sampling stations along the River. These data and samples are being analyzed at the Robert A. Taft Sanitary Engineering Center (Cincinnati, Ohio) of the FWPCA.

M. D. C. Sewage Collection and Disposal facilities and procedures for Charles River Watershed communities below South Natick Dam have been examined. Improvements in the order of $110 million capital outlay are under way, as reported to the April 18, 1967, and September 26, 1967 Coordinating Committee meetings. This includes $1 million Federal aid for the $4 million 233 mgd storm-and-sewage overflow detention chamber scheduled to be built on the north bank of the Charles approximately at the Inner Belt Expressway (I-695) crossing.

An inventory of sewage collection and disposal facilities and procedures in Charles River communities up-stream of South Natick dam is being made from NENYIAC and other Federal sources, also from the Commonwealth of Massachusetts data in the State Department of Public Health. A two-thirds Federally-aided consulting report to the MAPC on sewerage in the entire MAPC area, including much of the upper Charles Watershed, is due 1 July 1968. A Federally-aided reconnaissance report to the Eastern Massachusetts Regional Planning Project, covering all 35 Charles River municipalities was completed in July 1967.

h. Recreation and Open Space. Through the Eastern Mass. Regional Planning Project, the M.A.P.C., and the Massachusetts Department of Natural Resources, the Corps has been enabled to transcribe for the 35 Charles River Watershed municipalities the 1966 departmental wetlands inventory maps, also the departmental town-by-town summary sheet of wetlands evaluations, for Charles River Watershed municipalities. In addition, the Corps has been given access to the Department of Natural Resources 1964 town-by-town open space inventory work maps and matching identification lists for fifteen of the 35 Watershed cities and towns. In addition, two MAPC reports, each two-thirds Federally-aided are awaited, as mentioned at the April 18, 1967, and September 26, 1967 Charles River Coordinating Committee Meetings; namely, a report on the Charles, Neponset and Mystic Rivers, and a report on open space needs and recommendations for the 152 municipalities of the Federally-aided Eastern Massachusetts Regional

Planning Project, which includes all 35 Charles River Watershed cities and towns.

i. Navigation. From Corps records an abstract has been made of commercial barge movements through the Charles River Dam Lock at Leverett Street, Boston.

From M. D. C. records, the Corps has made an abstract of recreational boat movements through the lock, 1940-1966. From the Boston City Planning section of the Boston Redevelopment Authority, the Corps has received a list and location map of recreational boating organizations, boating facilities and numbers and kinds of boats on the Charles River Basin and on Jamaica Pond. The Corps secured numbers of rowing participants, and their daily and seasonal time patterns of rowing on the Basin. Also, the Corps has numbers of sailboats, but not of sailing participants.

Data have been exchanged with the Boston Redevelopment Authority, and are available to others interested. Both the Corps and the BRA are studying the boating peaks, and the capacities of the various sections of the $8\frac{1}{2}$-mile length of the Basin (17 miles shoreline) to sustain these or other boating and recreational and open space activities.

Progress to date on the foregoing nine study topics is reflected on the bar chart attached, lettered to correspond with the headings in paragraphs 7 and 11, above.

CHARLES RIVER WATERSHED COMPREHENSIVE STUDY

SCHEDULE AND PROGRESS CHART

1 OCTOBER 1967